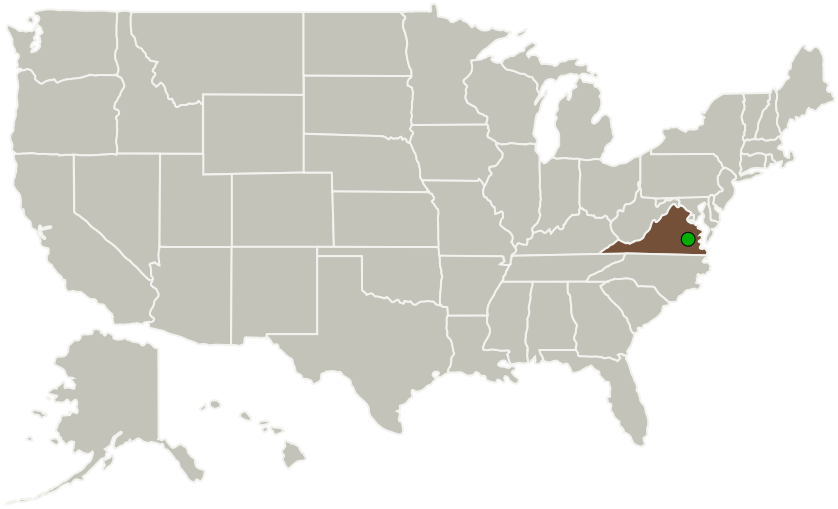
Crack Closure Based Self Healing Process for Metallic Structures, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

Analytical Services and Materials, Inc. (AS&M) is proposing to develop and validate a process that can extend the fatigue life of and potentially self-heal existing fatigue damage of aluminum and titanium alloys. The genesis of the proposed process is research conducted at the NASA Langley Research Center that developed a low melting point coating that flows into the crack when activated. The fatigue crack growth was postulated to be reduced due to a combination of adherence of the healing material to the crack surfaces (crack bridging) and filling of the crack with the healing material (crack closure). This process was demonstrated to reduce the crack growth rate (i.e., extend fatigue life) by a factor of 2 to 4x in inert environments. The proposed Phase I program will deliver experimental evidence of a self-healing material system and a preliminary design for an integrated healing activation system. The original research will be extended to operational environments and loading conditions with the goal of developing a system by the end of Phase II that will be viable for operational testing.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Analytical Services & Materials, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Hampton, Virginia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138904)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Analytical Services & Materials, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

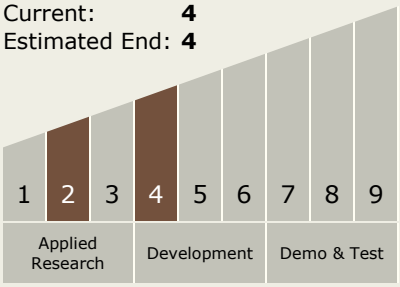
Carlos Torrez

Principal Investigator:

David Dawicke

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.2 Computational Materials

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System